

# National Weather Service Melbourne

## DRY SEASON FORECAST

Dec  
2016

### The Forecast

#### November – December - January

<p>STRONG EL NINO WEAK EL NINO NEUTRAL</p> <p><b>WEAK LA NINA</b></p> <p>STRONG LA NINA</p> <p><b>ENSO State</b></p>	<p>WELL ABOVE NORMAL <b>ABOVE NORMAL</b> NEAR NORMAL BELOW NORMAL WELL BELOW NORMAL</p> <p><b>Temperature</b></p>	<p>WELL ABOVE NORMAL ABOVE NORMAL NEAR NORMAL <b>BELOW NORMAL</b> WELL BELOW NORMAL</p> <p><b>Precipitation</b></p>	<p>WELL ABOVE NORMAL ABOVE NORMAL NEAR NORMAL BELOW NORMAL <b>WELL BELOW</b></p> <p><b>Storminess</b></p>
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#### February – March - April

<p>STRONG EL NINO WEAK EL NINO <b>NEUTRAL</b> WEAK LA NINA STRONG LA NINA</p> <p><b>ENSO State</b></p>	<p>WELL ABOVE NORMAL <b>ABOVE NORMAL</b> NEAR NORMAL BELOW NORMAL WELL BELOW NORMAL</p> <p><b>Temperature</b></p>	<p>WELL ABOVE NORMAL ABOVE NORMAL NEAR NORMAL <b>BELOW NORMAL</b> WELL BELOW NORMAL</p> <p><b>Precipitation</b></p>	<p>WELL ABOVE NORMAL ABOVE NORMAL NEAR NORMAL <b>BELOW NORMAL</b> WELL BELOW NORMAL</p> <p><b>Storminess</b></p>
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### Forecast Overview | Updated December 2016

- Weak La Nina conditions are forecast to continue into early 2017 before transitioning to ENSO neutral by late winter
- Seasonal temperatures should trend above normal, though uncertainty remains as other large scale atmospheric phenomenon can overwhelm a weak ENSO signal
- Shorter-range weather patterns will dictate the potential for freeze events in Central Florida into January (more information: [NAO](#), [AO](#), and [PNA](#))
- Seasonal precipitation is likely to trend below normal during the upcoming dry season, which may promote drought and condition the environment for an active wildfire season into early 2017
- While seasonal storminess is forecast to be below normal, individual storm systems can bring an increased risk of hazardous weather, including severe thunderstorms and tornadoes
- Continue to review your personal family all-hazards plan, including ways to receive severe weather warnings and knowing what to do when one is issued

### About this Product

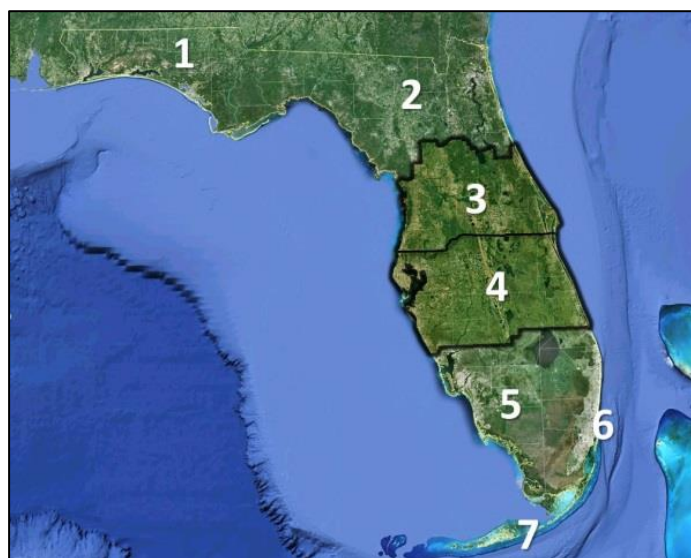
This forecast product is a result of research from the National Weather Service (NWS) in Melbourne, Florida on the El Niño - Southern Oscillation (ENSO) and its impact on Central Florida's dry season (November – April). This research, conducted since early 1997, was produced in recognition of the fact that climatic fluctuations on regional and global scales have been shown to have a profound impact on Florida's weather from season to season. The importance of seasonal forecasting continues to increase as extreme weather events affect more of Florida's growing population. These forecasts are meant to supplement, not replace, the official NWS Climate Prediction Center's (CPC) seasonal and winter outlooks by providing more detail and adaptive meteorological interpretation of the impact of predicted climatic events on Central Florida.

## Forecast Basis & Interpretation

The seasonal forecast is produced by a team of National Weather Service Melbourne meteorologists that employ the use of linear and logistic regression equations as well as analog-based techniques. These methods are based on the official observed and forecast Niño 3.4 and 3.0 values from the CPC and historical weather data for the Central Florida region. The accuracy of these indices will have a bearing on the accuracy of the seasonal forecast.

The Florida dry season forecast is issued for the period between November 1, 2016 and April 30, 2017 and is intended to serve as an early warning of significant impacts from climatic variability for planners and decision makers. Seasonal temperature and precipitation for Central Florida (climate divisions 3 and 4 as shown in figure 1), as well as the number of extratropical storms expected to impact the state are forecast into two separate periods: November-December-January (NDJ) and February-March-April (FMA).

The ENSO state and forecasts for storminess, rainfall, and temperature are divided into five categories, or quintiles: well below normal, below normal, normal, above normal, and well above normal. Discussions for each individual forecast parameter are included on the next several pages to help address uncertainty and should be used to supplement the forecast charts.



**Fig 1.** Temperature and precipitation forecasts are provided for Division 3 and 4 (Central Florida) while storminess forecasts are for the entire state of Florida.

# ENSO

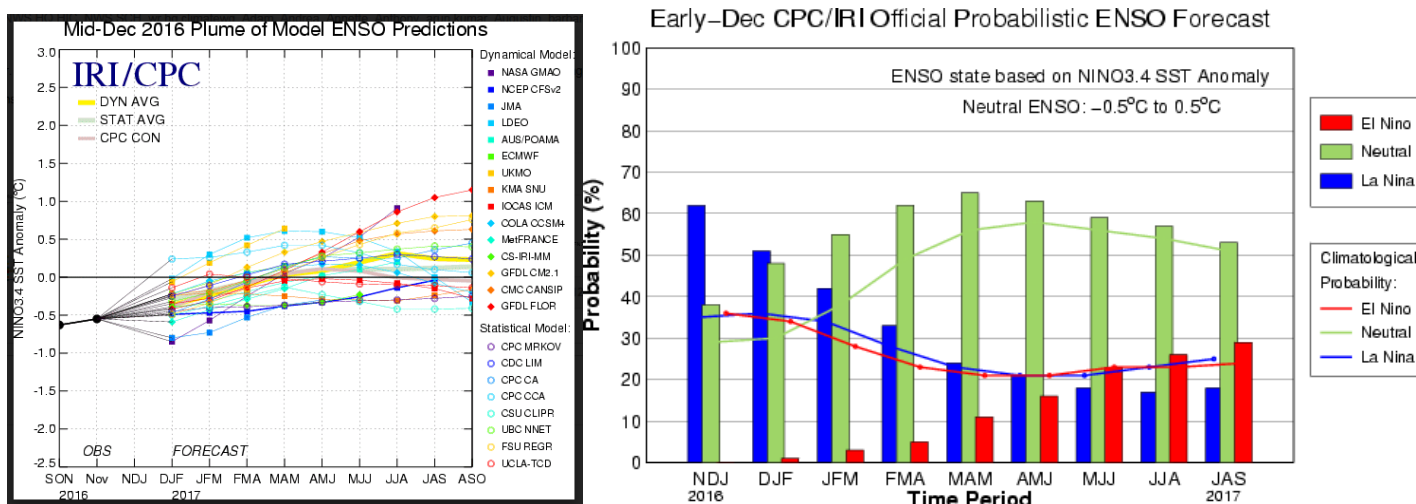
**Latest Discussion** | The latest ENSO Diagnostic Discussion from the Climate Prediction Center (CPC) indicates weak La Niña conditions were observed over the past several months and are favored into early 2017. A transition to ENSO-neutral is favored during January – March 2017.

Both atmospheric and oceanic conditions over the Tropical Pacific are generally consistent with La Niña conditions. Below-average sea surface temperatures have persisted over the east-central equatorial Pacific Ocean over the past several months, and the latest 3-month (September through November) running mean of SST departures in the Niño 3.4 region was  $-0.9^{\circ}\text{C}$ . As of December 12, the latest weekly SST departure in the Niño 3.4 region was  $-0.6^{\circ}\text{C}$ .

The latest computer model guidance favors La Niña conditions (3-month average Niño-3.4 index less than or equal to  $-0.5^{\circ}\text{C}$ ) into early 2017 before transitioning to ENSO-neutral during January – March.

**Additional Information** | The El Niño Southern Oscillation or ENSO is a complex meteorological phenomenon that relates to changes in sea surface temperature and sea level pressure over the equatorial regions of the Pacific Ocean. ENSO has a warm phase (El Niño) and a cool phase (La Niña) and has profound influences on the atmospheric circulations over the Pacific Ocean, and consequently, the circulations over North America and other parts of the globe. Locally, research shows that there is a physical relationship between the state of ENSO and the mean position of the jet stream over North America during the winter and spring seasons. These shifts in the jet stream often influence central Florida in the form of increased/decreased rainfall, storminess, and seasonal temperatures depending on the state of ENSO.

The relationship between Florida weather and ENSO is not just a simple “one-to-one” relationship, however, as other weather patterns (teleconnections) including the North Atlantic Oscillation (NAO), Arctic Oscillation (AO), Pacific-North American teleconnection pattern (PNA) and Madden-Julian Oscillation (MJO) can also play a major role in Florida dry season weather. Even when El Niño/La Niña conditions are occurring over the equatorial Pacific, these other teleconnections can act to enhance or suppress the impact of ENSO, or cause extreme variability on their own. Considerable uncertainty remains in longer range outlooks since these other oscillations are generally not predictable beyond 10 – 14 days.



**Fig 1.** ENSO guidance from the International Research Institute (IRI) for Climate and Society and the Climate Prediction Center (CPC). (a) Dynamical and statistical model plume of ENSO predictions. (b) ENSO forecast probabilities based off of a consensus between IRI and CPC forecasts.

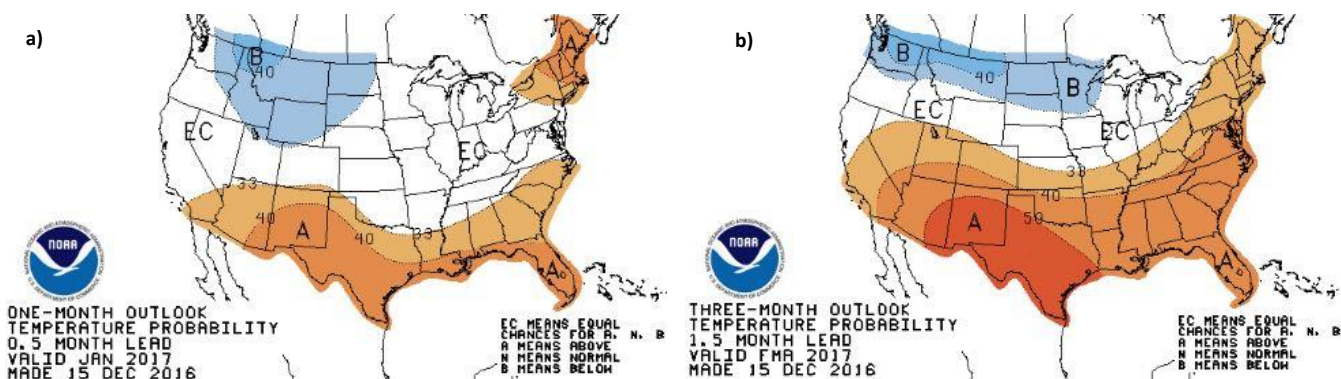
# Temperature

*Discussion* | The forecast for the 2016 – 2017 dry season continues to favor above normal temperatures, based on the assumption of continued cool ENSO conditions through winter. Forecast confidence remains low since other large-scale phenomena can overwhelm the weak ENSO signal.

Local research using logistic regression and analog-based techniques suggest less of a “warm” signal during the NDJ period with greater chances (50%) of above normal conditions occurring through the remainder of the dry season. This is in line with the latest CPC forecast (Figs. 3 a and b) which also favors above normal temperatures. It is important to remember that confidence in temperature forecasts is lower compared to other seasonal forecast parameters (i.e. rainfall and storminess).

Hard freezes across Central Florida are most common in the months of December and January. Freezing conditions can occur during all ENSO states (table 1), and examination of nine analog years with cool-neutral ENSO states indicated the majority of years experienced freezes at some point during the winter months. Again, other shorter-term teleconnections like the NAO and AO will dictate the timing of any threat of a dry season freeze event.

*Additional Information* | When trying to correlate the state of ENSO and seasonal temperature over Central Florida, one finds much less skill compared to precipitation and storminess. Other large-scale phenomena, including the North Atlantic Oscillation (NAO) and Arctic Oscillation (AO), play a significant role in the week-to-week weather patterns over the state. For instance, strongly negative (positive) phases of the AO often lead to colder (warmer) than normal weather across the eastern half of the United States, including Florida. The AO is not predictable beyond a few weeks, and there are no long-range outlooks available at this time.



**Fig 3.** Temperature probability outlooks issued by the Climate Prediction Center (CPC). Temperature probabilities for (a) Jan and (b) Feb-Apr-May.

ENSO State	Daytona Beach		Orlando		Melbourne		Vero Beach		ENSO State
	≤ 32°F	≤ 28°F	≤ 32°F	≤ 28°F	≤ 32°F	≤ 28°F	≤ 32°F	≤ 28°F	
El Niño	4.4	0.9	2.2	0.6	1.9	0.4	1.6	0.2	El Niño
Neutral	4.5	1.0	2.0	0.5	2.1	0.5	1.8	0.4	Neutral
La Niña	6.1	1.2	3.3	0.5	2.6	0.4	2.4	0.4	La Niña

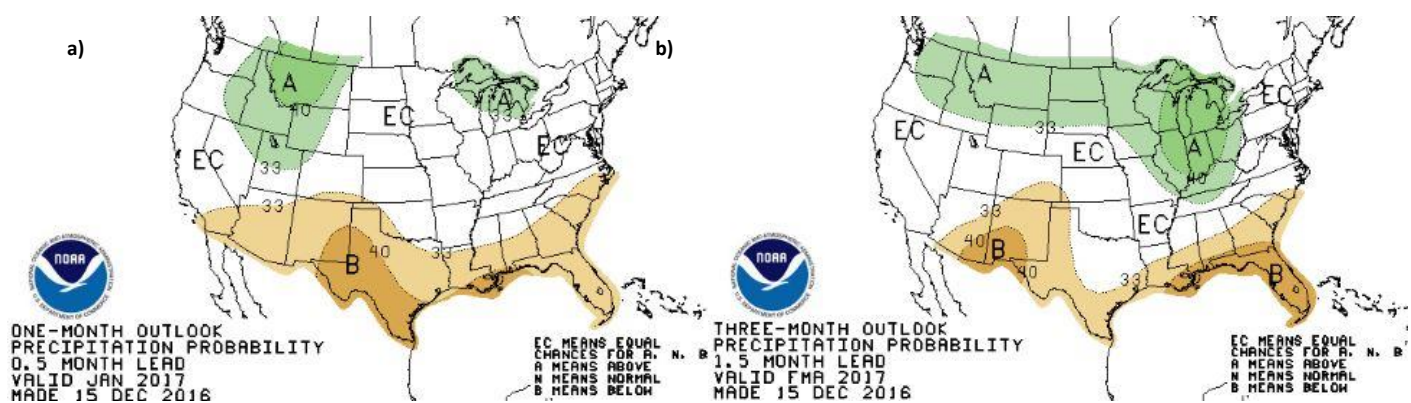
**Table 1.** Average number of days during the dry season when the minimum temperature reaches at or below freezing based on ENSO state. A hard freeze is when minimum temperatures reached 28°F or lower.

# Precipitation

*Discussion* | The forecast for the 2016 – 2017 dry season favors below average precipitation, based on the assumption of continued cool ENSO conditions through fall and winter.

Logistic regression and analog-based techniques support greater chances (50 – 55%) of drier than normal conditions occurring during the entire dry season. This is in line with the latest CPC forecast which also favors below normal precipitation. Below normal precipitation during the dry season may promote drought and condition the environment for an active wildfire season in early 2017.

*Additional Information* | The relationship between ENSO and rainfall is perhaps the most straightforward and statistically significant of all-weather parameters. In general, during the Florida dry season, substantial rainfall is only provided by passing extratropical disturbances in the westerlies or by stalled frontal boundaries. During an El Niño event, the number of extratropical systems is often increased over Florida and the Gulf of Mexico leading to above average rainfall. Likewise, during a La Niña event, rainfall is often lower than normal due to a limited number of extratropical systems impacting the state.



**Fig 4.** Precipitation probability outlooks issued by the Climate Prediction Center (CPC). Precipitation probabilities for (a) Jan and (b) Feb-Apr-May.



## Storminess

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*Discussion* | The forecast for the 2016 – 2017 dry season favors below average storminess for the state, based on the assumption of continued cool-neutral ENSO conditions through the winter. Based on the latest cool-neutral ENSO forecast, logistic regression guidance favors below normal storminess throughout the dry season.

While seasonal storminess is forecast to be below normal, individual storm systems can bring an increased risk of hazardous weather, including severe thunderstorms and tornadoes. Keep up to date with daily Hazardous Weather Outlooks out to 7 days for Florida from the NWS office responsible for your area. The NWS Melbourne office produces a daily Graphical Hazardous Weather Outlook for east central Florida in addition to the 7-day text product as do most Florida NWS offices. For longer range outlooks the Climate Prediction Center provides a U.S. Hazards Assessment out to 2 weeks

*Additional Information* | This forecast attempts to estimate the number of extratropical low pressure systems that will impact the state during a given dry season. There is a very strong relationship between ENSO and winter storminess and severe weather in Florida. Extratropical cyclones can produce excessive rainfall, severe thunderstorm winds, tornadoes, damaging straight-line winds, dangerous marine conditions, coastal flooding, and beach erosion. The number of extratropical low pressure systems passing near or over the state often decreases during cool-neutral and La Niña episodes due a northward shift in the position of the jet stream over North America.

## Preparedness Advice

While seasonal storminess is forecast to be below or near normal, individual storm systems can still bring an increased risk of hazardous weather, including severe thunderstorms and tornadoes. We've put together some safety information for you and your family to help prepare for when the next storm strikes.

### BE AWARE: PREPARE!

- ✓ Monitor local television, radio, and the internet for severe weather situations
  - Severe weather threats are typically identified a few days in advance, with more specific information about the most likely time(s) and location(s) of impact provided one day in advance
- ✓ Have an all-hazards plan in place
  - Every person and/or family should have an all-hazards plan that includes multiple ways to receive severe weather warnings and knowing what to do when one is issued
- ✓ Have the ability to receive timely weather warnings
  - Can save lives, especially with dangerous, nighttime tornadoes
- ✓ Have a dependable alerting feature or device
  - Ensure that you have a NOAA Weather Radio (programmed, with fresh batteries) and/or the Wireless Emergency Alert feature on your cell phone (or NWS warnings relayed by text message from Emergency Management, Media, or another reliable app)

### BEFORE / DURING THREAT

- ✓ If living in a mobile home, RV, or boat:
  - Make plans to stay with family or friends and leave before the severe weather arrives
  - If you can't leave, identify the closest sturdy shelter such as a clubhouse or laundry room and go there immediately if a warning is issued for your location
- ✓ Identify your shelter location and "safe place" in advance of a threat
  - Small interior room on the lowest floor of your home or business, far from windows
  - Ensure everyone in your family or business is aware of the location
- ✓ Words of advice from those who have survived tornadoes
  - "Putting on your shoes, placing your charged cell phone in your pocket, making good use of any kind of helmet and/or pillow to protect your head, and holding tightly to one another" (these actions must be done quickly and prior to the arrival of a tornado)
- ✓ If a tornado warning is issued for your location:
  - Take immediate action and move to your shelter, remain in place until the threat passes

## Helpful Links

### Teleconnection Guidance & Forecasts from the Climate Prediction Center (CPC)

[ENSO](#) | [AO](#) | [NAO](#) | [PNA](#) | [MJO](#)

### CPC Guidance (Temperature, Precipitation, Drought, Hazards)

[1-Month Outlook](#) | [3-Month Outlook \(~90 Days\)](#)

[U.S. Drought Information](#) | [U.S. Hazards Assessment](#) (out to 2 weeks)

### National Weather Service Melbourne, FL Research

[ENSO and Climate](#) | [Storminess](#) | [Severe Weather](#) | [Rainfall](#) | [Temperature](#)

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Issued: December 2016  
Next Forecast Issuance: February 2017